♥

ENGINEERING OPERATIONS COMMITTEE
MEETING MINUTES
FEBRUARY 2, 1995, 9:00 A.M.
EXECUTIVE CONFERENCE ROOM

Present:	R. A. Welke	C. J. Arnold	R. E. Maki
	G. D. Taylor	L. A. Kinney	L. Swanson (L.R.Brown)
	J. W. Reincke	J. D. O'Doherty	P. Lynwood (P.Miller)
	J. Erickson(FHWA)		D. Spangenberg (D.Vandenberg)
Guests:	W. C. Turner	J. Kelsch	M. VanAuken
	L. Galehouse	D. Poland	B. Nordlund
	C. Libiran	D. Smiley	L. Heinig

OLD BUSINESS

1. **Approval of the Minutes of the January 5, 1995, Meeting - R. Welke**

Minutes of the January 5, 1995, meeting were approved in accordance with the revisions regarding the Action statement for the following item:

NEW BUSINESS: Item No. 4, "Proposed Federal Traffic Barrier Policy"

ACTION; As Approved: Bob Maki, Traffic & Safety, was charged to take the lead in working with the Barrier Advisory Committee to review and assess existing practices, determine the cost implication to meet FHWA requirements, and prepare recommendations for consideration by the EOC. The findings and recommendations will be presented at the February 2, 1995, EOC meeting.

2. **Proposed Federal Traffic Barrier Policy - R. Maki**

Carlos Libiran, Chair of the Barrier Advisory Committee, reported on the committee's efforts to address the issues resulting from this proposed federal policy. Dave Morena, FHWA, has been involved in these discussions. It was pointed out that some questions remain unanswered and will not be resolved until NCHRP 350 testing is completed and an updated inventory of guardrail endings (for total cost estimation) is done. A formal response to FHWA is still needed.

ACTION: The Barrier Advisory Committee will continue its investigation and will return to the EOC with recommendations at the appropriate time. Carlos Libiran will prepare the response to FHWA for Bob Welke's signature, explaining our proposed course of action.

3. **Highway Preventative Maintenance: Safety Criteria - J. O'Doherty/L. Galehouse**

This item was introduced at the January 5, 1995, EOC meeting. Subsequent to that date, Maintenance met with Traffic and Safety, FHWA and district

representatives to develop criteria that shall apply to all preventative maintenance projects. The criteria are as follows:

1. Gravel shoulders shall require a minimum three-foot wide paved shoulder ribbon.

2. The districts are to conduct roadside hardware inspections to determine the amount of guardrail that has severe post and guardrail deterioration. The district will determine whether the guardrail should be upgraded on the preventative maintenance project or delayed until a future project. Replacement of deficient guardrail on freeways should be coordinated through the district project development engineers and the Lansing Traffic and Safety Division.

3. Cable-type guardrail shall be replaced with Type B guardrail or appropriate slope modifications.

4. Blunt and turned-down guardrail endings shall be replaced with a Breakaway Cable Terminal (BCT) or acceptable alternate.

5. Guardrail shall be connected to bridge rails and piers.

ACTION: The safety criteria were accepted, however, Jim Erickson noted that railroad crossings should be specifically addressed. Larry Galehouse is working with Traffic and Safety on this issue.

4. **Report on Draft Concrete White Paper - J. O'Doherty**

The draft white paper on "Preventative Maintenance of Concrete Pavements" was presented as requested at the January EOC meeting.

Increased early maintenance of durable concrete pavements is necessary to achieve the anticipated service life. Preventative maintenance is a series of scheduled maintenance activities to extend service life and prevent premature deterioration of the pavement structure, to maintain ride quality standards, and to restore the required minimum friction characteristics for concrete pavement. When properly selected, applied and timed, preventative maintenance treatments are very cost effective. Past practice and research suggest that preventative maintenance should continue until repair costs exceed the benefits derived from the treatments that are applied. A cost-benefit analysis is required prior to choosing an appropriate preventative maintenance action.

ACTION: The draft white paper was accepted for review, and comments will be received at the March EOC meeting.

It was recommended that a similar white paper be produced for bituminous pavements. John O'Doherty will assume the lead in preparing this companion document and will coordinate it with the Bituminous Advisory Committee.

NEW BUSINESS

1. **Special Provision for Polymer Modified Asphalt Mixtures - D. Coleman**

Doug Coleman could not make this meeting and no other representative from the Bituminous Advisory Committee was in attendance. Bob Welke expressed his concerns with the Special Provision as written and will contact Doug. Further discussion was postponed until the March EOC meeting. The special provision was returned to the Bituminous Advisory Committee because certain issues need more attention.

2. **Effect of Truck Loading on Bridges - J. Reincke**

Research reports from the University of Michigan entitled "Effect of Truck Loading on Bridges" and "Truck Loads on Selected Bridges in the Detroit Area" were discussed and approved. Results of this research project will be useful in bridge design procedures and possibly in pavement design procedures.

Actual truck loads were verified using special weigh-in-motion (WIM) technology. Truck drivers are not aware that their vehicles are being measured and, therefore, they do not make any special effort to avoid the WIM system. The heaviest trucks are 11-axle trucks with steel coils, gravel or asphalt. Measurements taken in the vicinity of truck weigh stations indicate legal weights. The further away from these stations, the greater the incidence of overloaded trucks.

ACTION:

1. The Materials and Technology Division will distribute the reports to the Design and Engineering Services Divisions, Districts 8 and 9, the Bureau of Transportation Planning, and the Motor Transport Division of the Michigan State Police.

2. The Design Division, in conjunction with the Materials and Technology Division, will use these reports as the basis for determining the appropriate live load to be applied to trunkline bridges. This applies to both girder and deck design, and the respective truck and axle load to be used. Current AASHTO HS25 live load used by MDOT and the new AASHTO Load and Resistance Factor Design (LRFD) live load should be compared to the results of the WIM data to determine the proper live load used in design.

3. The Design Division will review their bridge operating rating procedures to verify that the 5-axle truck and the 11-axle, 77-ton truck are a reasonable basis for determining bridge capacity.

4. The Design Division will review the reported dynamic load factors to determine whether the current AASHTO Bridge Design Specifications or the new LRFD Bridge Design Specifications for dynamic loading are most appropriate for designing bridges.

5. The Materials and Technology Division will further analyze the WIM data to determine if the load distribution to girders improves when heavy trucks are present. An improved load distribution would increase the calculated load-carrying capacity of the structure.

3. **Michigan Pre and Post Tensioned Concrete Bulb Tees - M. VanAuken**

Based on recent developments in precast prestressed concrete girders, Maury VanAuken presented a proposal to introduce and use the Michigan 1800mm bulb tee to achieve long-span bridge construction. The spans will range from 31m (100 feet) to 49m (160 feet), including simple and spliced span designs. The use of this design in long span projects will be beneficial through its cost-effectiveness (reduces the number of girders in a span) and increased safety (lateral stability). The 1800mm bulb tee will replace the 70-inch Wisconsin girder (maximum span of about 120 feet) in use since 1977.

ACTION: The new girder design is approved and Design will proceed to incorporate it in the appropriate long-span bridge projects.

4. **Final Report - Evaluation of the Dynamic Strength of Guardrail Posts Made From Recycled Plastic, Southwest Research Institute Project No. 06-3906 - J. Reincke**

The objective of this research was to determine the dynamic properties of wood, steel, and selected posts made from recycled plastic. The project was initiated when industry made recycled plastic posts available for guardrail application. The SWRI Pendulum Impact Facility is specifically designed for large scale impact tests. A total of 38 pendulum tests were performed.

The primary goal was to determine the optimum size recycled plastic post which could replace the standard 6"x8" wood or W6x9 steel guardrail post. The results of this research indicate that no posts made from purely recycled plastic are currently available which can be substituted as a direct replacement for conventional wood or steel posts.

ACTION: The EOC accepts the report as written, however, before it is transmitted to the FHWA, an executive summary will be prepared by Materials and Technology and sent to SWRI for a ten-day approval or rejection. The approved executive summary and action plan will be attached to the research report for distribution.

5. **Construction Zone Sign Sheeting - J. Reincke/B. Nordlund**

At the August 4, 1994, EOC meeting, the committee accepted a report to upgrade reflective sheeting on construction zone signs from engineer grade to fluorescent orange prismatic and approved the report's recommendation in concept. It was decided that an implementation plan should be developed through coordination with the industry. A committee was formed and a meeting was held in October, 1994, with representation from Construction, Maintenance, Traffic and Safety, Materials and Technology, districts, MRBA, and the County Road Association of Michigan. In the ensuing months, an implementation schedule and cost estimates were developed.

A three-phase implementation plan was drafted and was then reviewed and modified by the Construction Zone Advisory Committee. The implementation schedule, as submitted, is listed below.

PHASE I

For all freeway projects, all orange warning (W series) and guide (G series) construction zone signs used on mainline freeways and freeway-to-freeway connectors that are bid after May 1, 1995, shall be fluorescent prismatic (Type IV or VII) retro-reflective sheeting.

Industry and MDOT will meet in November of 1995, to discuss any problems encountered during the 1995 construction season.

PHASE II

In addition to Phase I, all orange warning (W series) and guide (G series) construction zone signs used on freeways and mainline roadways with speed limits greater than 45 mph, bid after July 1, 1996, shall be fluorescent prismatic retro-reflective sheeting.

PHASE III

All orange construction zone signs used on state roadways bid after October 1, 1997, shall be fluorescent prismatic.

MDOT uses about 250,000 square feet of construction zone sheeting annually. Two cost estimates were prepared. The Research Laboratory using figures and costs provided by industry (3M, Stimsonite, and ATSSA) estimated the cost of a fluorescent prismatic sign to be $9, equating to a $1 million increase over a three-year implementation schedule. Construction Division estimated the cost of the same sign at $12-15, which equates to a $1.7 million increase over using engineer grade signs.

ACTION: The EOC recommended that we proceed with the implementation of Phase I with the exception that the implementation date would be set by a team from Construction, Design and Traffic & Safety. (Note: July 1, 1995, was later selected.) The Construction Zone Advisory Committee (CZAC) is directed to monitor and evaluate Phase I and determine when to implement Phase II and Phase III. The CZAC will advise industry of this action by preparing a letter for R. Welke's signature.

6. **Advance Warning Arrow Panel Evaluation, Research Report No. R-1331, Project No. 93-TI-1698 - J. Reincke/B. Nordlund**

The study evaluated and compared several models of solar-powered arrowboards, as well as a motor-operated and battery-operated arrowboard, for legibility at one mile, but did not evaluate other characteristics such as lamp color, glare, angularity and solar efficiency. The study showed solar arrowboards (Type C) were not legible at one mile, the minimum distance for use on high-speed, high-volume construction projects. The report concludes that they should not be used under these conditions. The technology is changing and improvements in the future would warrant another evaluation.

Jon Reincke, supported by Bob Maki, recommended that the Action Plan be modified to include an EOC recommendation that the Construction Zone

Advisory Committee (CZAC) be directed to review and determine the potential applications and circumstances for using solar arrowboards given their current limitation; the CZAC should develop guidelines for their use and performance, and they should establish criteria for their evaluation. Solar arrowboards may have their place, and we need to define the circumstances governing their use and evaluate them accordingly, including other factors such as lamp color, glare, angularity, and solar efficiency in the evaluation. In urban situations, speeds are reduced and there is a need to reduce noise and air pollution, therefore, solar arrowboards may be an acceptable alternative.

Jim Erickson indicated FHWA may be flexible and would be willing to work with the department on this application.

ACTION: The research report will be modified to include the opportunity for future evaluations and will direct the CZAC to develop the necessary criteria, guidelines, and evaluation procedures for establishing the potential use of solar arrowboards in Michigan.

7. **Work Plan No. 143, Field Evaluation of Low VOC Bridge Paints, Research Project 94 G-303 - J. Reincke**

By 1996, the U.S. EPA will again lower the volatile organic content (VOC) of bridge paint systems. The current 3.5 lbs/gal allowance will be reduced to 2.9 lbs/gal. We anticipate that EPA will lower the VOC requirements again by the year 2000. It is an ongoing attempt to reduce solvent emissions. We need to be ready for any future reductions. Our current system meets the requirement of 2.9 lbs/gal (1996).

Since 1988, Research's Coatings Group has conducted accelerated laboratory testing of experimental bridge paint systems with VOC levels below 2.0 lbs/gal, but there are no available field performance data. The proposed study will compare the field performance of experimental low VOC coatings to each other and to our current system. It will also compare field results with laboratory data.

ACTION: The work plan and proposed research are approved. Materials and Technology will initiate the research project.

8. **Approval of 1995 Concrete QA/QC Trial Projects - J. Reincke**

Seven road projects and 25 bridge projects were submitted for the 1995 Concrete QA/QC trial program. This will be the fifth year for inclusion in the construction program. For 1996, and beyond, nearly all concrete projects will be governed by the QA/QC requirements.

ACTION: All projects submitted for the 1995 Concrete QA/QC program were approved. Design will take the appropriate action.

9. **Plastic Pipe: Letting Schedule - R. Welke**

A meeting was held on February 1, with the pipe industry to review the results of the consultant's investigative report and findings regarding recent installations

of concrete, metal and plastic pipe. The report indicated problems are present with all three pipe materials. A moratorium on the use of plastic pipe has been in effect since June of 1994.

The department is ready to move forward on the pipe issue. The EOC indicated there is a need to develop specification guidelines and criteria for acceptance of each product. The contractor must know up front what we expect and how pipe installations will be evaluated for acceptance.

ACTION: Mark Van Port Fleet will work with Design and Construction in the preparation of new pipe special provisions to cover all current situations. Special provisions will be ready for the April letting schedule and may be ready for the March letting by addenda.

10. **Recycled Concrete Use - R. Welke**

Bob Welke expressed concern about the potential for piles of salvaged concrete being left around, especially in rural areas like I-94 west of Kalamazoo. There is a strong local market for crushed recycled concrete in most situations. Once the material is crushed and stockpiled, it does not take long for it to disappear. We do not want contractors leaving piles of uncrushed concrete around any project area. We may need to require that it be crushed and stockpiled or require that it be buried. An option might be to require the contractor to give us a bond that any stockpiled materials will be used and gone from the site in three years.

ACTION: C. J. Arnold will discuss this issue with industry at the department/industry joint meeting later today.

(Signed copy on file at M&T)
Calvin Roberts, Secretary
Engineering Operations Committee

cc EOC Members
District Engineers

G. H. Grove	G. J. McCarthy	L. K. Heinig	T. Adams
E. D. Winkler	D. L. Coleman	W. C. Turner	D. L. Smiley
L. W. Martin	H. J. Nyquist	R. W. Muller	R. E. Nordlund
L. E. DeFrain	G. L. Mitchell	J. E. Norton	C. W. Whiteside
I. B. Patel	C. G. Cantrell	G. H. Gallup	A. G. Ostensen
J. Kelsch	G. J. Bukoski	R. D. Till	J. Becsey